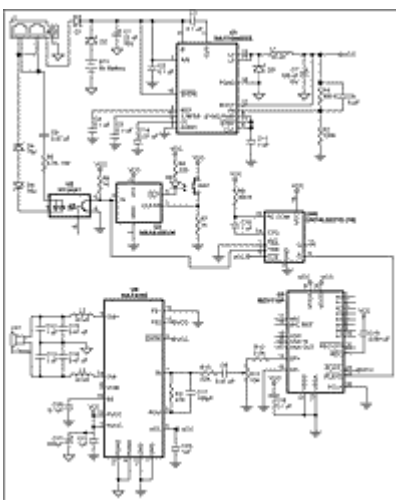


Chip Recorder Customizes Phone Ringer

Companies usually purchase one type of telephone for all employees. But this means that every ringer has the same sound and when one phone rings, a dozen people pause and look at their telephones. Equally annoying is the absence of a visual message indicator, so anyone who suspects they may have a message must lift the handset and listen for a special message tone.

By placing a circuit in series with the telephone (Figure 1), you can customize a phone ringer without modifying the phone. The heart of the ringer is a chip-recorder IC (U5) capable of playing up to 10 seconds of telephone-quality recorded sound. A high-efficiency step-down converter (U1) allows the circuitry to operate from a supply voltage of 5V to 14V.



[For larger image](#)

Figure 1. This circuit plays up to 10 seconds of recorded sound in place of the ring from a telephone. It also indicates when someone has called.

An opto-coupler and associated front-end circuitry monitor the line, sensing when the line receives a high-voltage ringer signal (Figure 2). Zener diodes D4 and D5 prevent the on-hook voltage from activating the opto-coupler. Comparator U3 latches LED D6 "on" when a call is received, and a pushbutton switch (SW1) clears the comparator.

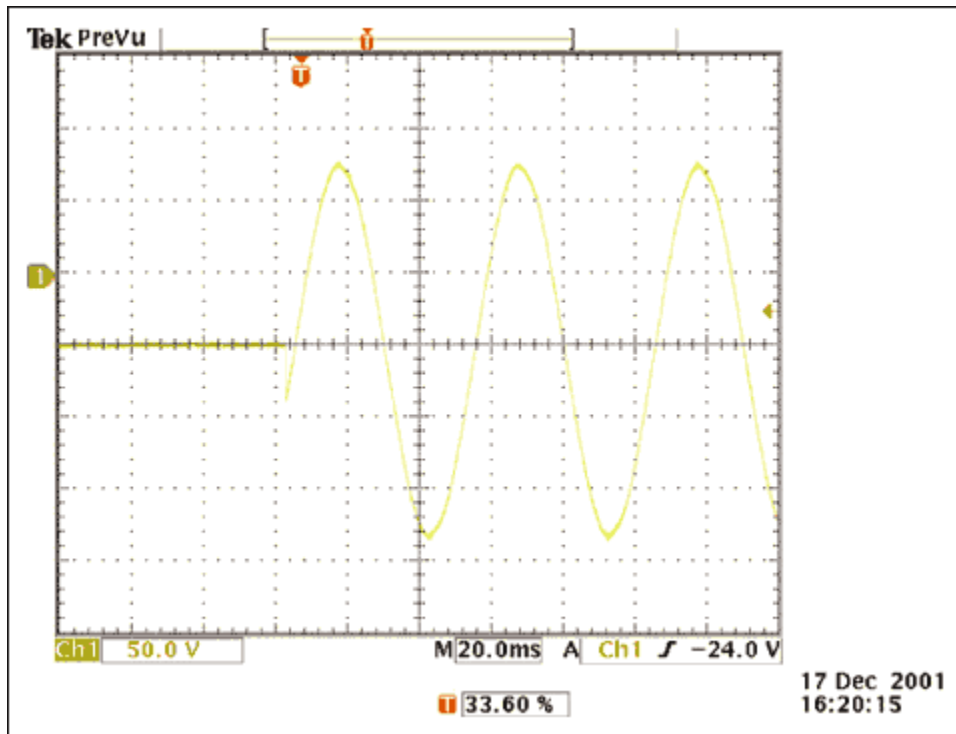


Figure 2. The ringer signal of a typical telephone exceeds 200Vp-p (vertical scale is 50V/div)

The circuit shown in Figure 3 records up to 10 seconds of sound in the chip recorder's proprietary multi-level EEPROM. A switch-mode, Class-D audio amplifier (U6) maintains high efficiency while delivering adequate power to an 8 Ω speaker (even a PC speaker will work).

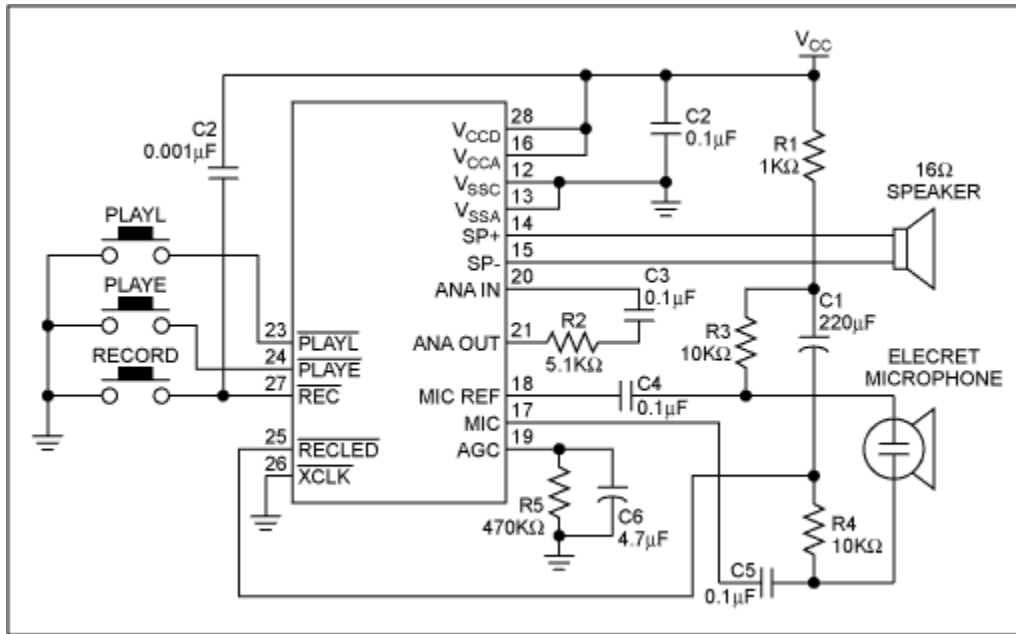


Figure 3. Using the EEPROM internal to U5 in Figure 1, this circuit records up to 10 seconds of sound.

A similar version of this article appeared in the July 25, 2002 issue of *EDN* magazine.

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